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SHORT COMMUNICATION

Leiobunum nigripes is a junior synonym of *Leiobunum verrucosum* (Opiliones, Sclerosomatidae)

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Abstract. Two nominal species of harvestmen from eastern North America, *Leiobunum verrucosum* and *L. nigripes*, are generally distinguished by color patterns. However, laboratory-reared individuals and sequential sampling in the field clearly show that adult individuals change from the "*verrucosum*" pattern to the "*nigripes*" pattern during normal maturation. Specimens of the two nominal species were obtained from the original H. C. Wood and C. M. Weed collections and found to be effectively identical in all diagnostic details. *Leiobunum nigripes* is a junior synonym of *L. verrucosum*.

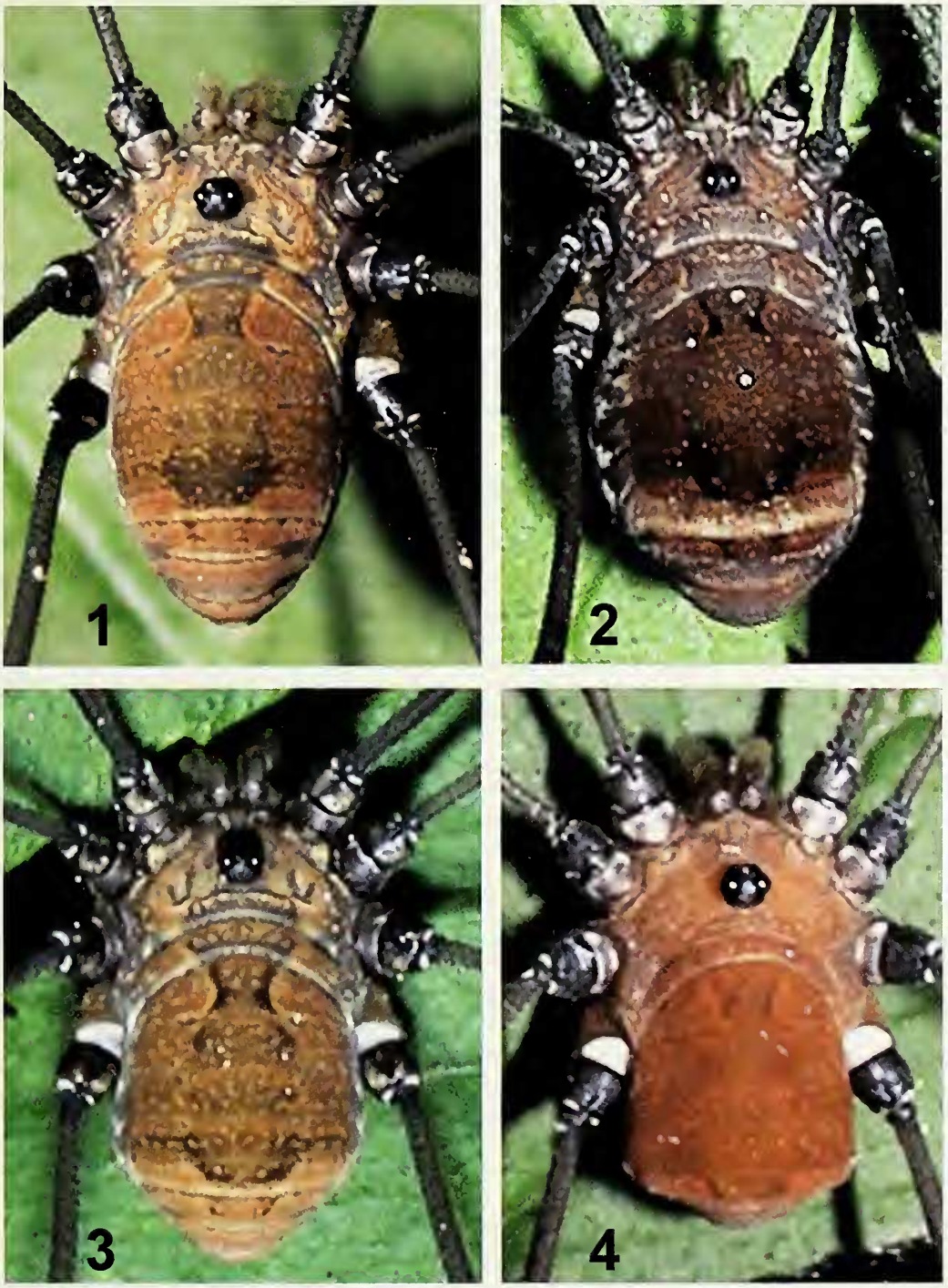
Keywords: North America, harvestmen, taxonomy

For several years, I have reared Maryland harvestmen in the laboratory and noted that newly molted adults of one species have a coloration that is considered typical of *Leiobunum verrucosum* (Wood 1868) and then gradually develop coloration typical of *Leiobunum nigripes* Weed 1892 (compare descriptions within Davis 1934; Bishop 1949; Edgar 1966, 1990). The color change is substantial in both sexes and is associated with cutieular hardening. Males and females are similar at first (Figs. 1, 3): the postocular carapace and scutum have a dark median figure with transverse rows of light spots, the remainder of the dorsum is a mottled golden brown, the venter is nearly white, and the pedal femur and tibia tend to have dark bands at their distal ends. As the males age, the golden-brown dorsum and white venter are replaced by a largely uniform orange to reddish-brown (somewhat lighter ventrally) color pattern, and the dorsal median figure is eliminated except for slight indications at its anterior and posterior extremes (Fig. 4). The legs also darken and thereby eliminate the banding. The dorsal surface of the females becomes a dark brown but the venter retains a light cream color and a light transverse band appears along the posterior margin of the scutum. The central figure is also reduced, but not as severely as in the males, and the legs also darken (Fig. 2). These observations prompted me to investigate the possibility that *L. nigripes* is actually a junior synonym of *L. verrucosum*.

Wood's (1868) original description of *Phalangium verrucosum* was based on male specimens of unknown origin. He described the specimens as having a sacculate ("alate") penis, black ocularium with two rows of stout denticles, evidence of a median dorsal figure behind the ocularium, a brown dorsum and light gray venter, dark trochanters and reddish-brown legs. The fate of Wood's type specimens is unknown, but my inspection of his surviving material maintained at the Academy of Natural Sciences in Philadelphia revealed a vial of four poorly preserved specimens labeled by Wood as *P. verrucosum* collected in Washington, D.C. All evidence of original coloration is now absent in these specimens, but the cuticle is well-enough preserved to show those features characteristic of the species now most commonly called *L. nigripes*, including 1) sacculate penis; 2) labrum with arrowhead-shaped terminus; 3) ocularium with two rows of short, stout denticles; and 4) pedal coxae I and IV with strong anterior rows of denticles (absent or weak in coxae II and III) and coxa I–IV with strong posterior rows of denticles.

Weed (1892) recorded specimens from Illinois and Ohio, which he originally identified as *L. verrucosum* (Weed 1887, 1889a, 1889b, 1890; see also Cokendolpher & Zeiders 2004). However, he also obtained two specimens from Queens County, New York from the eminent entomologist Nathan Banks, who had apparently identified the specimens as *L. verrucosum*. Significantly, Weed followed Banks (e.g., Banks 1901) in characterizing *L. verrucosum* as having a tapered abdomen, although Woods' specimens have truncated abdomens. The differences between Banks's specimens and those from Illinois and Ohio led Weed (1890) to propose a new species, *L. nigripes,* for the midwestern material. However, it is likely that the New York specimens were actually immatures of a now-unidentifiable species. This conclusion is based on the facts that Weed (1) simply quoted Wood's genitalic description of *L. verrucosum*, (2) assigned sexes to the two specimens based on relative body size rather than details of genitalia or palpal morphology, and (3) illustrated the palp with a pronounced patellar apophysis (Weed 1890, pl. VI, fig. 2k), a feature typical of immature *Leiobunum* and adult females of a few New York species (e.g., *L. calcar*, *L. nigropalpi*, *L. vittatum*). Thus, it is likely that misidentification by Banks led Weed to change an initially correct identification of the midwestern specimens and to propose a new species. My examination of the male lectotype and four male paralectotypes of *L. nigripes* from Weed's original colleetion revealed no significant differences with specimens of *Phalangium verrucosum* from the Wood collection. I conclude that *Leiobunum nigripes* and *L. verrucosum* are the same speeies.

Workers following Weed continued to recognize two species and to cite coloration as the key diagnostic character. For example, Davis (1934) acknowledged the substantial similarity of *L. verrucosum* and *L. nigripes*, noting that "Young adults of [*L. nigripes*] have a brown dorsum and a yellowish white venter which makes them readily confused with *L. verrucosum*. The legs, however, are not shaded distally in *L. nigripes*" (Davis 1934:682). The last statement is patently ineorrect and is, in any case, a rather trivial difference on which to base separation of species. Bishop (1949) did not compare the two species directly but cited no significant differences other than color and perhaps a more southerly distribution for *L. verrucosum*. Interestingly, a southeastern species, *L. formosum* (Wood 1868), may have contributed to confusion, because its somatic morphology and coloration are remarkably similar to those of *L. verrucosum* and even changes color during the adult stage. Specimens obtained from pitfall traps in southeastern Virginia, where ranges of *L. verrucosum* and *L. formosum* overlap, show that *L. verrucosum* passes through the "*verrucosum*-to-*nigripes*" color change during May and that *L. formosum* passes through a very similar color series during mid- to late July, although it retains the distally shaded leg segments.



Figures 1–4.—Comparison of typical coloration of early adult and late adult *Leiobunum verrucosum* from Maryland. 1. Early adult female. 2. Mature adult female. 3. Early adult male. 4. Mature adult male.

Misidentification of immature *L. formosum* as *L. verrucosum* may have contributed to Bishop's supposition that *L. verrucosum* is a southern species.

In summary, the name *L. nigripes* Weed 1889 should be regarded as a junior synonym of *L. verrucosum* (Wood 1868). Males of *L. verrucosum* are readily separated from other *Leiobunum* species of eastern North America by the following combination of characters: (1) sacculate penis; (2) labrum with arrowhead-shaped tip; (3) dark ocularium and pedal trochanters, which contrast with the dorsum and coxae; and (4) absence of terminal white banding on all leg segments. Females of *L. verrucosum* may be distinguished from those of most other *Leiobunum* species in that the femur of leg I is shorter than the length of the body and the trochanters and ocularium are dark and contrast with dorsum and pedal coxae. However, these features alone cannot be regarded as diagnostic, and this highlights the persistent need for a more thorough study of female characters in the genus.

Material examined for this study are lodged in the following institutions: Academy of Natural Sciences, Philadelphia (ANS); Illinois Natural History Survey, Champaign (INHS); National Museum of Natural History, Smithsonian Institution, Washington

D.C. (NMNH); Shultz Collection, University of Maryland, College Park (UMD); Virginia Museum of Natural History, Martinsville (VMNH).

Family Sclerosomatidae Simon 1879
Genus *Leiobunum* C. Koch 1839

Type species.—*Phalangium rotundum* Latreille 1798, by subsequent designation of Simon (1879:172)

Leiobunum verrucosum (Wood 1868)
Figs. 1–4

Phalangium verrucosum Wood 1868:29, 1 fig.
Liobunum verrucosum (Wood): Weed 1887:935; Weed 1889:88; Weed 1892:189–190, pl. VI.
Leiobunum verrucosum (Wood): Roewer 1910:217; Roewer 1923:898–899; Davis 1934:695–696, fig. 9; Bishop 1948:209–211, pl. 7, figs. 97–100; Edgar 1966:355, 364.
Liobunum nigripes Weed 1892:190–191, pl. VII, figs. 1, 2. **New synonymy.**
Leiobunum nigripes Weed: Roewer 1910:220–221; Roewer 1923:900; Davis 1934:681–682, fig. 26; Bishop 1949:198–199, pl. 5, figs. 65–68; Edgar 1966:355, 362; Katayama & Post 1974:18.

Type material examined.—*Leiobunum nigripes*: USA: *Illinois*: Champaign County: male lectotype, woods near Urbana, 40.1°N, 88.2°W, 8 July 1887 (INHS: #00882). Paralectotypes: 1 female, Urbana, 40.1°N, 88.2°W, 21 June 1887 (INHS: #00883); 1 male, woods near Urbana, 40.1°N, 88.2°W, 8 July 1887 (INHS: #00884); 1 female (INHS: #00885), Urbana, 40.1°N, 88.2°W, University Farm, among boards about farm, 23 June 1887; *Ohio*: Clermont County: 2 males: ca. 39°N, 84°W, August 1890 (NMNH).

Other material examined.—USA: *Maryland*: many specimens, Howard County, Columbia, Gorman Park, 39.165°N, 76.875°W, May–August 2004–2006, J.W. Shultz (UMD); many specimens, Montgomery County, Patapsco State Park, 39.253°N, 77.080°W, May–August 2004–2006, J.W. Shultz (UMD); many specimens, Prince Georges County, College Park, University System of Maryland Building, 39.004°N, 76.953°W, May–August 2004–2006, J.W. Shultz. *Mississippi*: 1 ♂, 2 ♀, Noxubee County, Noxubee NWR, Check Station, 33.2747°N, 88.7948°W, 2 August 2007, P. Miller, G. Stratton; 2 ♂, 1 ♀, Layfayette County, 1 mi [1.65 km] SW Abbeville, 34.489°N, 89.510°W, 4 August 2007, P. Miller, G. Stratton (UMD). *Ohio*: many males and females, Summit County, Bath Nature Preserve, 41.177°N, 81.642°W, 30 June 2005, J.W. Shultz (UMD). *Pennsylvania*: Bucks County: 5 ♀, Rushland, Coyne Farm, malaise trap, 40.250°N, 75.044°W, 31 May–5 June 1998, H.O'Connor (ANS); 4 ♂, 4 ♀, same data except 6–14 June 1998 (ANS); 4 ♀, same data except 24 June–10 July 1998 (ANS); many males and females, Bucks County, same data except 21 July–5 August 1998. *Virginia*: 6 ♂, 9 ♀, Clarke County, Blandy Experimental Farm, ca. 3 mi [4.8 km] S. of Boyce (39.06°N, 79.06°W), malaise trap, 2 July 1991, D.R. Smith (VMNH); 5 ♂, 4 ♀, same data except 25 April 1999 (VMNH); many males and females, Accomack County, Assateague Island, Chincoteague NWR, White Hills, 0.64 km N. of toll booths, 37.93°N, 75.33°W, 24 July–11 August 1998, VDNH survey (VMNH); 3 ♀, Northampton County, Savage Neck Natural Area Preserve, 37.33°N, 76.00°W, interdunal pond, 24 June–28 July 1999, A. Chazal, A. Foster (VMNH); 1 ♂, 5 ♀, Fluvanna County, Kents Store, 37.879°N, 78.129°W, Bell drift fence site, 24 July 1996, Molly Bell (VMNH). *District of Columbia*: 3 ♂, Washington, D.C., "District of Columbia," 39°N 77°W, no date or collector (ANS).

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